NATIONAL BUREAU OF STANDARDS REPORT

8698

THE EFFECT OF SURFACE REACTIONS
ON FATIGUE FAILURE

Quarterly Status Report March I to May 31, 1965

Ву

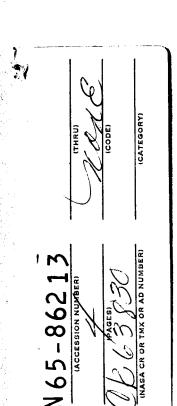
T. R. Shives and J. A. Bennett

Τo

National Aeronautics and Space Administration Order No (R-14), Amendment No. 4



U. S. DEPARTMENT OF COMMERCE NATIONAL BUREAU OF STANDARDS



THE NATIONAL BUREAU OF STANDARDS

The National Bureau of Standards is a principal focal point in the Federal Government for assuring maximum application of the physical and engineering sciences to the advancement of technology in industry and commerce. Its responsibilities include development and maintenance of the national standards of measurement, and the provisions of means for making measurements consistent with those standards; determination of physical constants and properties of materials; development of methods for testing materials, mechanisms, and structures, and making such tests as may be necessary, particularly for government agencies; cooperation in the establishment of standard practices for incorporation in codes and specifications; advisory service to government agencies on scientific and technical problems; invention and development of devices to serve special needs of the Government; assistance to industry, business, and consumers in the development and acceptance of commercial standards and simplified trade practice recommendations; administration of programs in cooperation with United States business groups and standards organizations for the development of international standards of practice; and maintenance of a clearinghouse for the collection and dissemination of scientific, technical, and engineering information. The scope of the Bureau's activities is suggested in the following listing of its four Institutes and their organizational units.

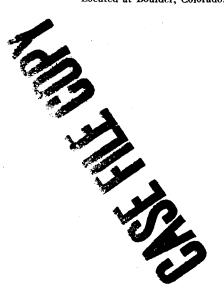
Institute for Basic Standards. Electricity. Metrology. Heat. Radiation Physics. Mechanics. Applied Mathematics. Atomic Physics. Physical Chemistry. Laboratory Astrophysics.* Radio Standards Laboratory: Radio Standards Physics; Radio Standards Engineering.** Office of Standard Reference Data.

Institute for Materials Research. Analytical Chemistry. Polymers. Metallurgy. Inorganic Materials. Reactor Radiations. Cryogenics.** Office of Standard Reference Materials.

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Institute for Applied Technology. Textiles and Apparel Technology Center. Building Research. Industrial Equipment. Information Technology. Performance Test Development. Instrumentation. Transport Systems. Office of Technical Services. Office of Weights and Measures. Office of Engineering Standards. Office of Industrial Services.

^{*} NBS Group, Joint Institute for Laboratory Astrophysics at the University of Colorado. ** Located at Boulder, Colorado.



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NBS PROJECT

NBS REPORT

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This project was authorized for the period September 1, 1964 to August 31, 1965 by National Aeronautics and Space Administration Purchase Order No. R-14, Amendment No. 4. The most recent project status report was submitted to the National Aeronautics and Space Administration in NBS Report 8649 dated March 17, 1965.

During this reporting period equipment for conducting fatigue tests in very dry atmospheres and in inert atmospheres has been completed. This includes a gas purification system and the use of a more efficient environmental chamber around the specimen. An electrolytic hygrometer capable of measuring very small amounts of moisture in gases has been purchased and is in use.

Fatigue tests on specimens of Ti-4Al-4Mn in an inert atmosphere have begun. Results of tests conducted thus far indicate that moisture has a deleterious effect on the fatigue life of this titanium alloy even in the absence of oxygen. It is not yet possible to conclude whether there is any significant difference in the fatigue life of specimens tested in a moist, oxygen-free atmosphere and those tested in a moist atmosphere containing oxygen. Neither can it be said with any certainty whether there is any difference in fatigue life between specimens tested in a dry, oxygen-free atmosphere and those tested in a dry atmosphere containing oxygen.

Specimens of vacuum melted 4340 steel have been produced. Tests on these specimens and further tests on the titanium alloy specimens will be conducted during the next reporting period.

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